REMARKS

Claims 1-62 are pending in this Application. No new matter is added. Reconsideration in view of the following remarks is respectfully requested.

I. Claims Define Patentable Subject Matter

The Office Action rejects claims 1-8, 16-18, 20-21, 29, 34-41, 49-51, 53-54, and 61-62 under 35 U.S.C. §103(a) as being unpatentable over Affes (US 2002/0051433) in view of Unser ("Sampling – 50 Years After Shannon", Proceedings of the IEEE, Vol. 88, No. 4: pages 569-587, April 2000); rejects claims 9-15, 19, 22-25, 30, 42-48, 52, and 55-58 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser and further in view of Agee (US 2003/0123384); rejects claims 26 and 59 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser, Agee, and further in view of Huang (USPN 6,370,129); rejects claims 27 and 60 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser and further in view of Shatti (USPN 7,076,168); rejects claim 28 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser and further in view of Langberg (USPN 5,852,630); and rejects claims 31-33 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser, Agee, and further in view of Baum (USPN 7,218,666). Applicants respectfully traverse these rejections, as follows.

Applicants disclose a novel and unobvious approach for processing signals that are sent over a wireless communication channel. For example, in accordance with an embodiment of the disclosure, a receiver may decode a received signal by sampling the received signal with a sampling frequency that is lower than the sampling frequency given by the Shannon theorem, lower than the chip rate of the received signal, but greater than the

rate of innovation of the received signal. Such a decoding method may thus reduce the complexity and cost of receivers while retaining equivalent decoding performances.

Claim 1 recites, *inter alia*, "sampling the received signal (y(t)) with a sampling frequency (f_s) lower than the sampling frequency given by the Shannon theorem, lower than the chip rate ($1/T_c$) of said received signal (y(t)), but greater than the rate of innovation (ρ) of said received signal (y(t)), for generating a set of sampled values ($y(nT_s)$)" (emphasis added). Claims 28, 34, and 61-62 recite similar features.

In rejecting the claims, the Examiner, at page 3 of the Office Action, acknowledges that the primary reference, Affes, does not disclose or suggest sampling the signal with a sampling frequency that is lower than the chip rate ($1/T_c$) of the signal, but greater than the rate of innovation (ρ) of the signal, as recited in claims 1, 28, 34, and 61-62, yet continues to rely on Unser to make up for the lack of disclosure in Affes.

In particular, the Examiner, at pages 3-4 of the Office Action, alleges that because Affes teaches sampling at the chip rate and Unser teaches sampling at the rate of innovation, "it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the known sampling system of Affes in view of Unser to sample in between the known sampling thresholds since such a modification yields predictable results and benefits." Applicants respectfully disagree.

A. Combination of Affes and Unser fails to disclose a sampling frequency that is lower than the chip rate, but greater than the rate of innovation, as recited in claims 1, 28, 34, and 61-62.

Applicants do not contend that Unser discloses sampling a signal at the rate of innovation. Unser, at section V, B, lines 7-9, states that "a reconstruction is generally possible provided there are as many measurements as there are degrees of freedom in the

signal representation." As the Examiner accurately suggested, the rate of innovation of a signal is defined as the number of degrees of freedom of the signal per unit time. It logically follows then that Unser teaches that reconstruction of a signal is possible provided that the sampling rate is equal to the rate of innovation of the signal. This, however, is irrelevant because the claims expressly require sampling a signal at a frequency greater than the rate of innovation. Applicants respectfully submit that sampling at a frequency greater than the rate of innovation is very different from sampling at a frequency that is equal to the rate of innovation. Thus, Unser fails to disclose or suggest a sampling frequency that is lower than the chip rate, but greater than the rate of innovation, as recited in claims 1, 28, 34, and 61-62.

Applicants also do not contend that Affes discloses sampling a signal at a chip rate. Specifically, Affes, in paragraph [0119], discloses that "the matched filtered signal vector Y(t) ... is sampled by sampler 23 at the chip rate $1/T_c$" (emphasis added). This, however, is also irrelevant because the claims expressly require sampling a signal at a frequency lower than the chip rate. Applicants respectfully submit that sampling at a frequency lower than the chip rate is very different from sampling at a frequency that is equal to a chip rate. Thus, Affes fails to disclose or suggest a sampling frequency that is lower than the chip rate, but greater than the rate of innovation, as recited in claims 1, 28, 34, and 61-62.

It is thus quite evident that Affes and Unser, either individually or in combination fail to disclose a sampling frequency that is lower than the chip rate, but greater than the rate of innovation, as recited in claims 1, 28, 34, and 61-62.

B. Affes teaches away from a sampling frequency that is lower than the chip rate, but greater than the rate of innovation, as recited in claims 1, 28, 34, and 61-62.

Applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art at the time of the invention modify Affes with a sampling frequency that is lower than the chip rate, but greater than the rate of innovation, because Affes teaches away from such a modification.

Specifically, Affes, in paragraph [0119], discloses that "the matched filtered signal vector Y(t) ... is sampled by sampler 23 at the chip rate $1/T_c$" (emphasis added), and not at a rate lower than the chip rate. In paragraphs [0138]-[0139], Affes states that "after sampling at the chip rate $1/T_c$ and framing over 2L-1 chip samples at the bit rate to from a frame, the preprocessing unit 18 derives the Mx(2L – 1) matched-filtering observation matrix." Throughout paragraphs [0140]-[0145], Affes describes how using a post-correlation data model (PCM) with the matrix parameters derived from sampling the signal vector Y(t) at the chip rate $1/T_c$ reduces inter-symbol interference. Thus, not only does Affes fail to disclose a sampling frequency lower than the chip rate, Affes teaches away from such a sampling frequency by placing such a great emphasis on sampling at the chip rate in order to reduce inter-symbol interference.

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). The Federal Circuit has held that teaching away from the art of the subject invention is a per se demonstration of lack of *prima facie* obviousness. *In re Dow Chemical Co.*, 837 F.2d 469, 5 USPQ2d 1529 (Fed. Cir. 1988).

C. Affes rate, Modifying Affes with a sampling frequency that is lower than the chip but greater than the rate of innovation, would render the system of inoperable for its intended purpose.

Applicants respectfully submit that one of ordinary skill in the art would not be motivated to lower the sampling frequency of Affes to below the chip rate, as suggested by the Examiner, because such a modification would cause the device of Affes unable to reduce inter-symbol interference as a result of the lower sampling rate, rendering the device of Affes inoperable for its intended purpose.

If a reference is cited that requires some modification in order to meet the claimed invention or requires some modification in order to be properly combined with another reference and such a modification destroys the purpose or function of the invention disclosed in the reference, one of ordinary skill in the art would not have found a reason to make the claimed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

D. Examiner's rationale for combining Affes and Unser is improper.

In general, it appears that the Examiner's rationale for combining the teachings of Affes and Unser is to achieve the benefits identified in Applicants' Specification (e.g., to reduce the complexity and cost of receivers while retaining equivalent decoding performances (paragraph [0011] of the published Specification)). Applicants respectfully submit that this is an unacceptable and improper basis for a rejection under 35 U.S.C. § 103.

In essence, the Examiner is basing the rejection on the assertion that it would have been obvious to do something not suggested in the art because so doing would provide advantages stated in Applicants' Specification. This sort of rationale has been condemned by the CAFC; see, for example, *Panduit Corp. v. Dennison Manufacturing Co.*, 1 USPQ2d 1593 (Fed. Cir. 1987).

E. Examiner's allegation of obviousness lacks sufficient documentary evidence.

The Examiner has not provided any documentary evidence suggesting that one of ordinary skill would have been motivated to modify Affes as suggested by the Examiner. The Examiner's rationale for modifying Affes appears to be derived from the knowledge gleaned solely from the Applicants' disclosure. Applicants request that the Examiner cite a reference in support of the position pursuant to MPEP 2144.03 if the rejection of the independent claims is maintained. Absent documentary support, Applicants respectfully submit that the features recited in the claims are not obvious over Affes and Unser, and the claims are believed to be allowable for at least the above stated reasons.

F. Examiner has failed to establish a proper *prima facie* case of obviousness.

To reject claims in an application under § 103, the Examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP §2143. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Here, the Examiner has failed to meet all of the three criteria required for a *prima facie* case of obviousness. Specifically, the Examiner (1) failed to present any documentary

evidence of motivation either in the Affes or Unser or in the knowledge generally available to one of ordinary skill in the art, to modify Affes or to combine reference teachings; (2) the Examiner failed to show how the proposed modification of Affes has a reasonable expectation of success, as the proposed modification would render Affes inoperable for its intended purpose; and (3) the Examiner failed to show that Affes and Unser teach or suggest all the claim limitations (e.g., sampling the received signal with a sampling frequency lower than the chip rate of said received signal, but greater than the rate of innovation of said received signal, as recited in claims 1, 28, 34, and 61-62). As such, the Examiner has failed to establish a proper *prima facie* case of obviousness.

* * * * *

Secondary references Agee, Huang, Shatti, Langberg, Baum, either individually or in combination with Affes and Unser also fail to disclose or suggest the features recited in claims 1 and 28, 34, and 61-62, and as such, fail to make up for the deficiencies of Affes and Unser.

In view of the foregoing, Applicants submit that claims 1, 28, 34, and 61-62 define patentable subject matter. Claims 2-33 and 35-60 depend from claims 1 and 34, respectively, and therefore, also define patentable subject matter, as well as for the additional features recited therein. Accordingly, Applicants respectfully request that the rejections be withdrawn.

II. Conclusion

In light of the amendments contained herein, Applicants submit that the application is in condition for allowance, for which early action is requested.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number set forth below.

Please charge any fees or overpayments that may be due with this response to Deposit Account No. 17-0026.

Respectfully Submitted,

Dated: 3/1/2010

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